DOCUMENT RESUME

ED 380 093 IR 017 014

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TITLE Visual Resources on the Internet.
PUB DATE [95]
NOTE 10p.; In: Imagery and Visual Literacy: Selected Readings from the Annual Conference of the International Visual Literacy Association (26th, Tempe, Arizona, October 12-16, 1994); see IR 016 977.
PUB TYPE Guides - Non-Classroom Use (055) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Access to Information; *Computer Graphics; *Computer Networks; Educational Media; Elementary Secondary Education; Imagery; Instructional Materials; Manipulative Materials; *Online Systems; Pilot Projects; *Visual Aids; *Visual Arts
IDENTIFIERS Digital Imagery; *Internet

ABSTRACT

With the development of the Internet technology and proliferation of the network application, visual materials have been digitized and archived on many publicly accessible computer servers. However, these visual resources can be beneficial to educators only when they know what they are, what they look like, in what format they are created, and how they can be used for instructional purposes. The purpose of this paper is to demonstrate: (1) the richness and diversity of the visual resources on the Internet; (2) the major categories of resources; (3) their characteristics; (4) the popular format in which they have been created and archived; (5) common access points to the resources on the Internet; and (6) pilot projects of how visual resources are used in the classroom for instructional purposes. The history of and some data on the Internet is provided. Visual resources on the Internet are characterized as digital, interactive, and manipulative, and they can be classified into three major categories: still images, motion pictures, and Internet news and discussion groups. Netiquette (network etiquette), problems, and rules for using Internet visual resources are outlined. Two appendices define 22 network terms and abbreviations, and offer a list of visual resources available on the Internet. (MAS)

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Visual Resources on the Internet

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Introduction

In the preface of "Visual Literacy" (1993), D. M. Moore & F. M. Dwyer notes that "The study of visuals is a broad and complex mixture of many disciplines, interests, and functions. Scholars interested in the way visuals transmit information, emotion, and data are not limited to any one discipline because of the universal nature of images. " (p ix). "By the very nature of this diverse subject," the authors continue to note that "there is necessarily a wide variety of interests and perspectives on the topic." (p ix). Visual resources on the **Internet** which have been developed by the major educational and scientific institutions as well as by business industries have recently aroused much interest among educators, scientists, businessmen, and the general public and have revealed great potential for educational research and instruction.

With the development of the Internet technology and proliferation of the network application, visual materials which include paintings, drawings, charts, photographs, computer graphics, and even animations and motion pictures, etc. have been digitized and archived on many computer servers on the Internet which are publicly accessible. However, these visual resources can be beneficial to us as educators only when we realize what they are, what they look like, what format they are created, and how they can be used for instructional purposes. The purpose of this presentation is to demonstrate: (1) the richness and diversity of the visual resources on the Internet, (2) the major categories of the visual resources, (3) characteristics of the visual resources, (4) the popular format in which they have been created and archived, (5) common accesses to the resources on the Internet; and (6) pilot projects of how visual resources are used in the classroom for instructional purposes

Internet

Dan Van Belleghem, who helps connect organizations to the Internet for the National Science Foundation, says, "Nobody has ever dropped of the network. Once they get on they get hooked. " (Krol, 1993) What is so magical about the Internet? How can we navigate this information superhighway to find the visual resources we are interested?

The Internet was originally developed in 1969 by the Pentagon as the **ARPANET** (Advanced Research Projects Agency), a computer

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networking project, to transmit packets of military data securely and efficiently around the world. In 1984, the National Science Foundation began building five supercomputers around the country for conducting scientific research. When Defense Department researchers wanted access to the supercomputers as well, the **N.S.F.** linked them up with **MPANET**. The popularity of computer access, especially to collaborate on-line, has steadily expanded ever since.

Technically, the Internet is the world's largest collection of decentralized computer networks, with over 30,000 computer networks connecting more than 1.5 million computers to one another using the high-speed **TCP/IP** telecommunications protocol. Through the Internet, at least 15 million people in over 200 countries send and receive **e-mail**, engage in thousands of discussion groups, conduct research and development projects, and utilize a wide array of public and private information services. The Internet is the fastest growing telecommunications network, with a growth rate of nearly 10% per month as of mid-1993.

What makes the Internet unique is that it is a two-way communications medium. It gives users the ability to respond immediately, and select information services or contact suppliers of goods and services. The Internet will succeed where other mass marketing information systems have failed because access to it is ubiquitous and well-defined.

Everything from the complete works of Shakespeare to the pictures of Clinton's inauguration, and the number of sodas in a Coke machine at Carnegie-Mellon University is accessible. The primary use of the Net is for communication, however. "Half the traffic on the Internet is e-mail at this point," says Mandel. The number of topics on the newsgroups can be daunting. Today, users can talk to one another, send e-mail back and forth, join arcane discussion groups, tap into libraries in universities from Berkeley to Bern and exchange almost any sort of data, including pictures, sound and text. Recently, a cult movie called "Wax" was broadcast to Internet sites all around the country. While it was black and white and only two frames per second, it was an important first step toward the computer equivalent of cable broadcasting. Also, a radio program is already broadcast weekly on the Net, complete with technology news and a "Geek of the Week" segment.

Some interesting data about the Internet:

1. More than 1.5 million computer systems including mainframe, mini computer and microcomputer of various platforms around the whole world are connected to the Internet

2. Up to 15 million people in more than 200 countries have the access to the Internet in one way or the other

3. The number of computers linked to the Internet has doubled every year between 1988 and 1992

4. In 1993, the increase rate slowed slightly but still reached up to 80 percent

5. More than 2500 subjects are being actively discussed over the Internet

Visual Resources

Visual resources on the Internet are the digital images (e.g. pictures, animations, etc.) which can be visually perceived or the verbal information which discuss about the visual resource archives and explain the ways of how to perceive and appreciate visual images; their fundamental function is for educational, scientific, and entertainment purposes and they are archived in the form of electronic data on the computers which are connected to the Internet. According to R. A. Braden (1993, "Visual Literacy", D. M. Moore, et a la, p 193), visual resources are categorized in several ways, "they can be classified according to the end purposes: educational, promotional, entertainment, art".

Visual resources on the Internet are prolific in volume, rich in subjects, and diverse in formats. The major characteristic of the visual resources on the Internet are that they are: (1) digital; (2) interactive; and (3) manipulative. In the simplest sense, they can be classified into three major categories: 1) still images; 2) motion pictures; and 3) Internet news and discussion groups. There are also many other ways to categorize the visual resources. Most common ways of categorization include: 1. by subjects, such as digital virtual reality, scientific research, art and humanity, etc.; 2. by specific topic, such as Congress Library's Exhibits of 1492-An On-going Voyage, Scrolling the Dead Sea, and Vatican Exhibit, etc.; 3. by computer databases, such as Smithsonian Photol and Strange Interaction database at University of Illinois; 4. by the image file formats, the most commonly seen formats for the still images on the Internet include **GIF**, **BMP**, **TIF**, **JPG**, etc. while the formats for motion pictures are normally **MPG** for both PC and Macintosh and Quicktime movies for Macintosh. News and discussion groups on the Internet, however, generally refer to OK **Bitnet** listserv discussion groups, **Usenet** Newsgroups, local **BBS**, and **Gopher** and **WAIS** databases.

Netiquette for Using Visual Resources on the Internet:

Netiquette is a combination of two words. Net from Internet and etiquette. Thus we get netiquette meaning etiquette on the Internet. The Internet was developed initially to share military data, conduct scientific research and collaborate on-line. There is no charge and no governing body for the use of the Internet. Basically there are no rules for use, no one to answer to, because of this there are abuses of the privilege of using the Internet. Some of those abuses are: (1) illegally storing and transferring copyrighted material, (2) flaming users for their lack of knowledge or mistakes, (3) storing and transferring pornographic material, and (4) electronic stalking of children.

The last two has made news several times in the last several months. Talab (1994) states "A sex-related discussion group, known as a news group, exchanges child pornography via the Internet." While these two may not involve copyright penalties, they do involve criminal penalties.

Care should be exercised when downloading and using files. Probably the first rule to use in downloading files is use only major sites. Sites such as major educational institutions, NASA and the Smithsonian will have files which have legally been placed on servers for Internet use.

Some sites may not have the legal right to place pictures and other works on the Internet. If you are in doubt, get permission to use a picture. You could be held legally responsible for not obtaining those rights.

The Internet user is not invisible to other users. Your e-mail or other works could be stripped of headers and signatures and sent to someone else or large groups of people. Care should be used in making responses to and about others on the Internet. More than a few individuals have wished that they had been more careful in their responses on the Internet. Flaming, abusive and highly critical remarks made to others for mistakes that they make in using the Internet, is also improper conduct. Many network administrators will revoke privileges if proper conduct and consideration is not used.

There has been a proliferation of pornographic pictures placed on the Internet. Many of these pictures deal with subjects who are minors. In some countries these images are legal but in this country you could find yourself in serious legal trouble. Recently in national reports, individuals have been arrested for downloading such files. Be careful of what you download and how you use it. Someone may be watching you.

Another similar area has been "electronic stalking" of children. This usually occurs on K-12 bulletin boards. Children are at first engaged in conversation which turns to sexual contexts. Individuals then try to set up a meeting with these children for sexual purposes.

In a resent telecast, a man flew to Florida to meet a young boy for a sexual encounter. He was arrested at the airport when he arrived. He had been communicating with a police officer. Police departments are beginning to establish divisions to keep watch and monitor electronic activity involving minors.

Use of Internet resources requires responsible conduct by those individuals using the Internet. Without responsible conduct and adhering to the intent of the Internet, we may see government intervention and censorship. Remember proper etiquette and ethics especially in making responses, e-mail communication and downloading and using files will continue the success of the Internet..

Some Problems in Using Visual Resources on the Internet:

Unfortunately, just because the Internet is a decentralized global computer network, the visual resources available on the Internet are very disorganized, which is partly the reason of this project. Another problem is that some visual resources that were available on the Net one day could be gone the next. There are many reasons for this, but two of the most common are

computer redeployment and over utilization.

The other problem driving resources away is the success of the Internet itself. If 1% of the Internet users used a resource daily five years ago, there'd be about 100 uses per day. If that same percentage holds today, there could be as many as 100,000 uses per day. Suddenly, the background service being offered eats up so much of the machine that the machine's primary reason for existence can no longer be accomplished and the service is turned off.

For the new user, "persistence" is the key word. When you are trying to use the Internet, especially for the first few times, you may be unsuccessful in making connections. This leaves the user with a feeling of frustration and failure. There are several reasons for this: the time of the day or the amount of usage.

Depending on the time of day that you try to access a site you may not be able to get connected. This is due to servers being busy, other people are connected. If you keep trying you can eventually get connected. Keep in mind what time zone the site is that you are trying to access.

Another reason for not being able to connect to a site is that the host computer may have been shut down. It could be that site received more use than was planned by those maintaining the site or financial costs made it impossible to keep the host on-line.

You never know from day to day if a site will be active. You may access a site today and tomorrow the site is no longer active. There could also be technical problems that could keep a site inactive. You have to keep trying different sites, so don't be discouraged.

Mosaic

NCSA Mosaic, an information browser developed at the National Center for Supercomputing Applications. This document is an interactive hypermedia tour of Mosaic's capabilities.

Mosaic is an Internet-based global hypermedia browser that allows you to discover, retrieve, and display documents and data from all over the Internet. Mosaic is part of the World Wide Web project, a distributed hypermedia environment originated at CERN and collaborated upon by a large, informal, and international design and development team. Mosaic helps you explore a huge and rapidly expanding universe of information and gives you powerful new capabilities for interacting with information.

General Rules of Using the Internet Visual Resources

Visual resources on the Internet including still images, motion pictures, regardless of format, and some articles posted on the news and discussion groups may be covered by restrictions, and/or copyright. They are available only for non-commercial, personal use. Copying or redistribution in any manner for personal or corporate gain is not permitted.

Users can download these resource files for their own use, but they are subject to any additional terms or restrictions which may be provided with the individual file or program. There's no charge for the user, but when downloading visual files for the relocation purposes, all the accompanying text information (accompanying ASCII text caption files contained on the source server) must be included, and must be presented completely and unchanged.

In general, any use of the Internet visual resources for academic purposes is encouraged, but the permissions should be obtained from the producer or owner if the visual resources are going to be published. Permission for such use is normally granted on a case-by-case basis. Some people or organizations may charge a certain amount of fee for the process depending on the type and nature of the proposed use.

Conclusion

This is only an initial effort to help individuals to become aware of the visual resources on the Internet, to explore those visual resources archived on the Internet, to record the Internet sites as well as downloading files from those sites. It is also our desire to provide more application examples which employ the visual resources on the Internet for the instructional purposes.

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Krol, E. *(1993)*. The whole Krol. "mail to: forum@gnn.com" (Internet address)

Talab, R. (1994). Copyright, Legal, and Ethical Issues in the Internet Environment. Tech Trends, 39(2), 11-14.

Appendix A

* Terms as defined in the Microsoft Windows Reference Manual, The Whole Internet, Microsoft Windows User's Guide, and Adobe Photoshop User Guide

ARPAnet

a computer networking project, to transmit packets of military data securely and efficiently around the world. It is not in existence today.

BBS

stands for Bulletin Board System. The BBS allows individuals to chat with other users, to view bulletins and share information and files.

BMP

stands for bitmap. It is an image stored as a pattern of dots (or screen pixels).

Bitnet

(Because It's Time NETwork) allows data to be transferred between educational and research institutions

e-mail

shortened form of electronic mail. It is a way of sending mail around the world within a matter of seconds by using the Internet

ftp

or file transfer protocol, defines how files are sent from one computer to another regardless of what platform the two computers are operating (i.e. PC to MAC)

GIF

Graphics Interchange Format is CompuServe's file format for passing files between other types of computers

Gopher

a menu-based lookup tool for exploring Internet resources. You don't have to know the IP address or domain name. You find it in the Gopher resources and select it. Gopher then "goes fer" it.

IP

This is the Internet Protocol. It is the most important protocol on which the Internet is based. It allows a packet to traverse multiple networks on the way to its final destination.

Internet

The Internet is a world-wide network of networks comprised of about 30,000 computer networks

JPG

JPG -- Joint Photographic Experts Group. ISO/CCITT standard for compressing images using discrete cosine transform. Provides LOUSY compression which means the sharpness from the original images will be lost

Major advantage:

It provides a compression ratios of 100:1 and higher which greatly reduce the size of a digitized graphic image. The more the loss can be tolerated, the more the image can be compressed

JPEG uses the JPEG File Interchange Format, or JFIF. File extensions are .JPG or .JFF. MPEG is the JPEG counterpart for full-motion digital video. (See "Popular Video/Animation File Formats on the Internet")

MPG

MPEG/MPG MPEG -- Motion Picture Expert Group

MPEG is a video compression algorithm which reduces the size of a digitized video file but still can play it in nearly real time mode.

Three types of coded frames: "I" or intra frames which are simply a frame coded as a still image, not using any past history; "P" or predicted frames, which are predicted from the most recently reconstructed I or P frame in terms of decompression; and lastly, "B" or bi-directional frames, which are predicted from the closest two I or P frames, one in the past and one in the future.

Many different versions of MPEG decoders for both DOS and Microsoft Windows which can handle I, P, and B frames and play the MPG format movie files. Some of the Window MPEG player programs such as XingIt supports OLE.

Mosaic

an information browser developed at the National Center for Supercomputing Applications. Mosaic is an Internet-based global hypermedia browser that allows you to discover, retrieve, and display documents and data from all over the Internet.

N.S.F.

National Science Foundation

packet

a bundle of data varying in size from 40 to 32000 bytes

PICT

This file format is widely used by Macintosh graphics and page layout applications. It allows files to be transferred between applications.

protocol

is how computers will act when talking to each other.

TCP

The Transmission Control Protocol. One of the protocols on which the Internet is based.

TIFF

stands for Tagged Image Format. It is another way that images may be stored. It allows for file transfers between different applications and different computer platforms.

Usenet

an informal group of systems that exchange "news."

WAIS

stands for Wide-area information servers. This is a very powerful system for looking up information in databases across the Internet.

WWW

World Wide Web. A hypertext-based system for finding and accessing Internet resources.

Appendix B
Hotlist of the Visual Resources on the Internet
Still Images:

http://www.hcc.hawaii.edu/dinos/dinos.1.html
http://www.tig.com/IBC/AfterHours.html
http://www.well.com/Community/Jaron.Lanier/art.html
http://www.einet.net/galaxy/Arts-and-Humanities/Visual-Arts.html
http://marvel.stsci.edu/wfpc2-images.html
ftp://amanda.physics.wisc.edu:/pub/art/
http://siggraph.org
http://gnn.com/ora/
http://InforMNs.k12.mn.us/rfe/chukotka
gopher://groundhog.sprl.umich.edu
http://meteora.ucsd.edu/~norman/paris/
http://www.atmos.uiuc.edu/weather/weather.html
http://www.atmos.uiuc.edu/wxworld/html/general.html
http://metaverse.com/vibe/
http://olt.et.tudelft.nl/fun/pictures/pictures.html
gopher://gopher.panix.com/11/nyart
http://www.cs.colorado.edu/htbin/grepitp
http://www.ncsa.uiuc.edu/DigLib/prototype/Black-Hole-Spacetime-Anninos.html

Digitized Video/Animation:

http://force.stwing.upenn.edu:8001/~jruspini/starwars.html
http://metaverse.com/knet/
http://archpropplan.auckland.ac.nz/People/Mat/gallery/animations.html
http://www.rpi.edu/Internet/Guides/decemj/internet-cmc.html

Usenet News Group:

news:news.art.com
http://web.cnam.fr/Images/Usenet/
http://www.cis.ohio-state.edu/hypertext/faq/usenet/graphics/top.html

General Information:

http://nearnet.gnn.com/GN-ORA.html
http://cui_www.unige.ch/OSG/MultimediaInfo/index.html
http://www.rpi.edu/Internet/Guides/decem
http://metaverse.com/space/index.html
http://www.well.com/Community/index.html
http://wings.buffalo.edu/contest/awards/index.html